GARDEN AND FOREST.

PUBLISHED WEEKLY BY

THE GARDEN AND FOREST PUBLISHING CO.

OFFICE: TRIBUNE BUILDING, NEW YORK.

Conducted by . . . . . Professor C. S. SARGENT.

ENTERED AS SECOND-CLASS MATTER AT THE POST-OFFICE AT NEW YORK, N. Y.

NEW YORK, WEDNESDAY, AUGUST 25, 1897.

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The Planting of Private Grounds.

THIS is a season when little actual work needs to be done in gardens and pleasure-grounds. Therefore it is a good time for contemplation—for self-instruction. It is the time to judge the results of past work—to decide whether what has been achieved is good or is bad, and to examine why it is so. And it is the time to plan for the future—to decide what more shall be done, what shall be undone, and from what the enterprising hand shall be altogether withheld. Plans should be made to correct past sins of commission, to repair past sins of omission, and to guard against both for the days to come.

The great sin of commission which a study of ornamental private grounds in all parts of our country reveals, is the failure to cut out trees and shrubs which were always ill-placed or which have been rendered detrimental or superfluous by years of growth and development. Everywhere we see country places, small ones especially, which, whether viewed from the inside or the outside, are less beautiful than they might be because their plantations are too crowded. A house may well be draped and shaded, but it should not be concealed or smothered by foliage. Charming outlooks ought not to be shut off. A fine tree ought not to be hampered in its development by others less attractive. Two or three trees of equal excellence ought not to be allowed to survive so long together that the beauty of all will be ruined. A shrubbery ought not to look like a rough thicket, nor should a place be so crowded with shrubberies as to look like a wilderness. Health as well as beauty demands that foliage should not be too dense in the neighborhood of a dwelling-house, for human beings, no less than plants, need the free ministration of the winds and the sunshine of heaven. Therefore, at this season of the year, every owner of a country place, large or small, should look carefully at his trees and shrubs, and should decide whether it may not be for the greatest good of the greatest number (himself and his family included) that some of them shall be cut out.

Corresponding to this sin of omitting to use the axe when its use is required, is the sin of commission involved in planting excessive numbers of trees and shrubs. Even when allowance is made for the need of young trees to be protected, and for the need of the planter to guard against the possible failure of some, too many are usually set out on a new place where Nature has not already supplied a superabundance. The beauty of placid open spaces of grass, the charm of far-away vistas and the dignity of simplicity in the general effect of a place are forgotten. Even when large lawns are reserved, they are generally sprinkled over with isolated plants to such a degree that their true beauty is fatally impaired. Therefore the owner of a place where planting is needed should carefully consider, before the season to attempt it begins, just where he had best put his thick plantations, and just how many—or, rather, how few—trees and groups of shrubs need to be set near his house and upon his lawn. He should have a definite scheme in mind before any work is started, and, in spite of the profuse temptations of nursery and garden catalogues, he should strictly adhere to this scheme unless definite good reasons for its alteration present themselves.

Of course, it is impossible to lay down any general rules with regard to the desirable amount or to the desirable distribution of foliage in a small country place; for each place differs from all others in the conformation of its ground, the character of its native vegetation, the attractions of its outlooks, and the tastes of its owners. For example, there are seaside situations where Nature has done scarcely any planting, and where no more is required by a sensitive eye unless, perhaps, in the way of a few hardy shrubs and vines set about the foundations of the house to make it look as though it belonged to the ground upon which it stands. On the other hand, in inland regions there are places where thick, shadowy groves of Nature's planting need only to be thinned sufficiently for the due admission of air and light and the opening of vistas. Between these two extremes lie many intermediate possibilities of beauty.

One general precept can, however, be laid down: Respect should be paid to the essential character of the country-side at large. If it is covered by trees of great size and beauty, your place will not look well if it seems to be a barren exception to the local rule of luxuriant growth. And, if it is a barren stretch of seashore, your place will not look well if you spend thousands of dollars in setting out thick groves of trees, and try to cultivate plants of luxuriant aspect better suited to the fertile soil and surroundings of some interior valley region. But even this great general rule of appropriateness to broad local conditions should not be pushed too far. Respect must be paid to the charms of variety as well as to those of harmony. In a thickly forested district, for example, fine trees should be secured; yet broad open lawns will be peculiarly attractive as a relief to the eye satiated with dense woodland effects. And, correspondingly, while many a seashore place demands no planting at all, yet if one or two good trees can be induced to grow near the house they may delight the eye much more than if they had been met with in regions where similar ones abound.

However, most people need to be more carefully warned against planting too much than against planting too little. It is extraordinary to see the energy often bestowed upon the creation of a wide lawn, and then the equal energy displayed in ruining it with a cluttered assemblage of freshly introduced plants. Everything which the spot naturally bore is cut down and grubbed up. Often even picturesque rocks, or wide low stones, invaluable as giving dignity and individuality to the place, are removed at great expense. And when at last the wide sheet of green is secured, forthwith it is broken up and frittered away by being dotted over with a hundred garden trees or shrubs.

The mention of rocks suggests another rule which may, in a general manner, be prescribed. If one or more stones, large or small, break the uniformity of a lawn, the places for possible planting are thus naturally indicated. Of course, even here planting is not always required, and it may even be injurious if a fine view is thereby spoiled, or if the har-

monious lines of other plantations are interfered with. But if the lawn is so large that a few trees or bits of lower foliage will not spoil it, and if no special reasons prevent, then the best places for them will be in association with any rocks or stones that may exist. The existence of these as alien objects in the spread of turf gives a logical reason for the presence of others. And the effect of both stone and tree will be enhanced by the association of the two. The Japanese understand this truth very clearly. There is nothing to which they give closer attention than to the grouping of trees and stones. Often, indeed, the rock or stone itself is introduced to complete an effect which seemed incomplete without it; and sometimes the desire for a stone appropriate for association with a given tree leads to its importation from some distant part of the empire. To such subtleties of artistic endeavor we have not yet attained. But two at least of our American landscape-gardeners—Mr. Olmsted and Mr. Vaux—have thoroughly understood how much beauty may be gained by the proper combination of vegetable and lithic forms. The result of their combined work may be studied in the Central Park. No features of this beautiful and individual pleasure-ground are more beautiful or more individual than its groupings of stones and foliage. And although some of its most admirable results in this direction were obtained by clothing existing rocks with foliage, in other cases the stones as well as the plants were deliberately selected and placed. The more "natural" their effect the less sure can the observer be that there is anything really natural about them, for he instinctively applies the word to those things in Central Park which are to-day most beautiful, while only the student who has inquired into its genesis can guess how often these very things are altogether the products of art.

If, therefore, a rock or stone breaks the uniformity of a lawn, the advisability of planting something in connection with it may well be considered. Of course, its size and shape and situation must determine how many plants should be set beside it, and of what sort and size they should be. If it is itself of large size, a goodly tree may overshadow it. A smaller stone will demand a smaller tree, or one or two graceful shrubs. And a ledge which spreads near the surface of the ground may demand only a prostrate shrub or some creeping plant. Vines may always be introduced, in moderation; but whether with vines or with larger plants, moderation must always be practised. The last thing that should be done with a picturesque stone is to cover it up. Its character should be enhanced and completed, not overshadowed or concealed. It should not be "planted out" by thick tall masses of foliage, nor allowed to disappear beneath heavy wreaths of trailing or creeping things. An harmonious group should be formed in which, as a rule, the stone itself should be the most conspicuous feature, or at least, speaking artistically, the central feature. How this should be done Nature will teach, if her own works are lovingly studied. The planter who has tasks of this kind before him cannot do better at this season than drive along the country roads, or wander through old meadows and open woodlands, and see with what combinations of foliage Nature adorns her huge rocks, her smaller boulders, and her low out-cropping ledges of stone.

The Dalles of the St. Croix, Wisconsin and Minnesota.

FOR some years a movement has been on foot to secure a reservation of about 1,550 acres on the picturesque banks of the St. Croix River for an interstate park. The nucleus of this park is a tract of one hundred and fifty acres already acquired, including some of the most picturesque scenery of that wild region which received its name from the early French voyageurs. The French word Dalles signifies flagstones, and the term was here applied on account of the peculiar stratification of the rocks of this part of the St. Croix River, which, owing to their post-glacial undermining by the water and the action of frost, have fallen down in great blocks and slabs, separated along their natural, almost upright planes from the rock walls which border the stream.

A gloomy grandeur characterizes this part of the river, which contrasts delightfully with the cheerful sparkle of the upper rapids, the quiet beauty of Thaxter's Lake and the sunny intervale with its scattered shade-trees, which are also features of the scene. The hills on the Wisconsin side are lofty, and the Minnesota gorges precipitous, and a fine old forest forms a boundary between the stern scenery of the embattled rocks and the quiet farm lands toward the west. Should the whole tract desired by the park commissioners be set apart by the legislatures of the two states it will include a most interesting variety of landscape, ranging from the broad lawn-like expanse of the intervale to the savage features of the shadowy gorges through which the whirling stream tumbles and foams. The hope is to maintain the wild, natural features of this scene, and to preserve and enhance its native distinction by protecting it from the devastating hand of the settler, the woodcutter and the manufacturer.

Some account of the strange formations which characterize this region may prove interesting. An admirable report, published recently, contains papers by scientific men and the landscape-gardener of the park, Mr. F. H. Nutter, and furnishes numerous valuable details concerning the reservation. From this report we learn that the Dalles of the St. Croix River, situated in Chisago County, Minnesota, at the head of navigation, with certain adjacent lands, were acquired by the appropriation of $6,000 by the Minnesota legislature in April, 1895, and ten days previously the Governor of Wisconsin approved a bill to obtain lands in Polk County of that state, along the east bank of the St. Croix, and commissioners were appointed to examine the lands and report concerning them. Since the purchase of the first 150 acres, bills have been pending before the legislatures of the two states to secure about 300 acres additional in Minnesota and 1,100 in Wisconsin, and it is to be hoped that political influence will not prevent the carrying out of a scheme so important to the welfare and enjoyment of future generations. Active-minded citizens have been working hard for this desired consummation, and great interest has been shown by the local press. A series of lectures at Taylor's Falls, Minnesota, was arranged for, to which eminent speakers gave their services, and the adjacent railways aided also. The commissioners worked with zeal, the ladies of the Twin Falls coöperated with the aldermen to help them, and the work was pushed along and public interest aroused so that it is to be hoped the future of the Interstate Park is practically assured.

The peculiar and unique character of the Dalles entitles them to be preserved from spoliation forever. The rocks which compose them are the trap or basalt which, when upheaved in vast masses and left to cool slowly under pressure, forms regular columns like those of Fingal's Cave or the Palisades of the Hudson. Here, however, where they were thrown up in lighter masses and cooled without great pressure, they form irregular angular heaps with smooth, almost unbroken cleavage. Their color is beautiful and varied, owing not alone to their mineral composition, but to the growth of minute lichens upon their surfaces, which vary in color with the dryness or moisture of the atmosphere. Sometimes they are sombre gray, and again iridescent with opaline tints. The rock angles are sharp, their faces as unworn as if they had not weathered thousands of years of storms, and they are especially remarkable for the freakish forms in which they rise into columns or monumental piles, and for the strange outlines of human faces which one detects in their irregular shapes. Holes, called wells, some of which are thirty feet in diameter, and others only a few inches wide, are found here, formed by the churning of bowlders during the cascade period through which the

region passed in prehistoric days. In some of the wells the drilling rock is still found; in others it has entirely disappeared. Into one of these wells, eight feet in diameter, a pole has been thrust down thirty feet; others are choked with débris and cannot be fathomed. Of the columnar formations the Devil's Chair is the best known. This towers about eighty feet above the level of the river, in the form of a huge chair, apparently built by some giant, of roughly hewn masses of rock. Vegetation clusters about its base, and tall Pines spring from the cliffs behind it, but its smooth top is bare, like some strange vestige of the furniture of an age of Titans. The Hammer Head is a column with two grotesque faces looking in opposite directions, like a statue of Janus, and the Sentinel, or Warden, on a ledge overlooking the Narrows just below the bridge, is strangely real, lifting a stern granite profile against the sky. Other faces, in which one detects fancied resemblances to Washington or Napoleon, are found all through the region, and one, Professor Edwards tells us, is a gigantic likeness of a Ute Indian, with Pine-trees for feathers, and trailing vines for scalp-lock, while a leafless Pine branch does duty for a pipe in his mouth. On the Minnesota side of the river there are all sorts of queer rock formations, of such supernatural size and shape that they are called Devil's Bake Oven, Devil's Pulpit, Devil's Parlor, etc., but on the Wisconsin side holier emblems appear, and one of its most striking features is the uplifted image of a great stone cross, which, particularly when touched by the rays of the sunset, is a noble and impressive monument. On this bank also is found a lovely lake, a beautiful resort for canoeists.

The Indian name of the most beautiful lake of the region, Kichisago Sagi-a-gan, meaning large and lovely lake, still lingers in the name of Chisago County. Traces of early French occupation are found dating to about 1700, when the long-vanished fort St. Croix was established on a plateau below the Dalles. Near Taylor's Falls were still to be seen in 1851 the stone foundations of at least nine houses, over some of which were growing trees two feet in diameter, with hearthstones worn smooth by use, apparently a century old. This early civilization had been long extinct, however, when the pioneer of the present settlement put in claims to the Dalles in 1837. The village of St. Croix was first known by the Indian name of Caw-caw-baw-kong, which might seem to have been suggested by the warning notes of crows, but means simply the waterfall. This name is still preserved in a neighboring cemetery.

The flora of the Dalles is rich in vines and flowers that love a northern climate, and its silva consists of Pines, Firs, Cedars, Birches, Willows, Poplars, Maples, Walnuts, Elms, Ashes and Oaks. The rocks are hung with Ferns and Harebells, and all sorts of sweet wood blossoms are found in their season nestling in the shade. The Walking Fern lingers in the little marshes at the base of the trap-rocks, and Arrow-heads abound. Here, too, flourishes the Cranberry, trailing its delicate vines over barren surfaces, and Grasses and wild plants clamber over the hills in profusion. A report by Mr. Conway Macmillan, State Botanist of Minnesota, states that if it had been the idea of the legislatures of the adjacent states to preserve a typical group of northern plants as a kind of natural botanic garden, they could scarcely have selected a more favorable locality than the region about the Dalles. Few southern varieties of trees have strayed into this region, but the Juniper, the Larch, the Spruce and the Canadian Yew abound, while some noble specimens of the White Pine survive the wholesale devastation by the lumbermen. A variety of the Club Moss is characteristic of the bare hills near Taylor's Falls, and Ferns flourish freely, among them the little Woodsia, the Rock Brake and the Bulb-bearing Fern, which tapestries the cool ravines with its feathery fronds. The wonderful Mosses and Lichens which play so important a part in the color-scheme of the Dalles have already been referred to, and among the former are seen the famous Reindeer Moss, more properly a Lichen, and the Fountain Moss, found only in water, grows here to sometimes a foot in length. Liverworts, kindred to the Mosses, are also in profusion, and great carpets of them may be found on damp cliffs near the springs. About a thousand species of the higher groups of plants are established about the Dalles. Rock Cresses and the Jewel-weed are everywhere. The Ram's-head, Lady's-slipper and the tiny Hydrocotyle now and then appear. Anemones, Violets, Jack-in-the-pulpit and other northern flowers in spring, and Golden-rod and Asters in autumn make the woods and fields gay with blossom. Heaths, dwarf Cornels, Indian Pipes, the southern Pulses and Spurges also abound, and one interesting plant, the Prickly-pear Cactus, has strayed hither from the desert. In short, the Dalles are a natural wild garden full of interest.

The landscape beauty of this reservation is inexhaustible. From one high point on the Wisconsin side below the elbow in the Dalles is seen the little town of Taylor's Falls nestling by the river, and another distant town on the Minnesota side gleams white against the background of hills dark with evergreens. A slender steel bridge spans the winding river, and under it the water foams and swirls between the rocky banks crowned with Spruces and Firs. Other stretches of the stream are as still as a lake in whose quiet bosom the shores are reflected, and a floating canoe scarce leaves a ripple behind. In the rapids all is commotion. The drifting logs struggle in heaps; the vexed stream roars and leaps, white with foam, down the incline. Again you paddle through a narrow gorge, where strange forms rise like monuments before the wondering gaze. Marvels of color delight one. Nature has clothed the rocks with red and purple and green, festooned them with vines and starred them with tender flowers. On all this beauty stern rock faces look down like petrified Jötuns mourning over the destruction of their forest home. There is a mysterious and terrible attraction about the fathomless wells dug by the slow grinding of the glacier. The geological formation tells a tale of prehistoric convulsions, of strange upheavals, of a boiling caldron wherein bowlders and pebbles whirled about, and are now found imbedded in the trap-rock like plums in a monster pudding, afar from the present bed of the stream.

Merely as an object-lesson of botanic and general scientific value the Dalles are well worth preserving, and their exquisite wild beauty will be more and more cherished as the region about becomes more settled. It is a source of gratification to all lovers of nature that public-spirited citizens enough were found in the two states to preserve this gem of natural scenery from destruction as an Interstate Park before the hand of the spoiler, with pick and axe, had converted its rare features into utilitarian dust and ashes.

Hingham, Mass. *Mary C. Robbins.*

Œcological Notes upon the White Pine.

THE œcology of the Pines, especially of the White Pine, Pinus strobus, has interested me for many years. I have seen the White Pine in about all the conditions to which it is subject in the region of the Great Lakes, the Saint Lawrence, the upper Mississippi and the northern reaches of the Alleghanies, which constitute its principal geographical range, and no tree growing within this climatic area adapts itself to a greater variety of soil conditions. The American Aspen, the White Elm, the Red Maple and the Red Cedar compare most favorably with it in this regard. Its most congenial soil is one containing a fair supply of sand and gravel or light loam, where it usually attains the largest size. It does not generally occupy the ground so exclusively as the Gray Pine, P. Banksiana, or the Red Pine, P. resinosa, or several of the southern Pines. The finest examples are isolated or in companies of a few in forests of deciduous trees. Here it becomes their competitor, and from its range and ability to hold its own, except against fire and the axe, I should

never suspect any lack of virility, as has sometimes been charged to it.

The extreme conditions of soil and moisture for the White Pine are reached in the sand dunes and the rocky ledge and the peaty swamp. In dune regions its chief hardwood competitors are Oaks, mostly the Black, Scarlet, White and Bur Oak. In damper areas among the dunes, where the mineral constituent of the soil is chiefly sand, but mixed with more organic matter than on the hills, its principal competitors are species of Poplar and Birch. The dunes by the Great Lakes are as typical as any. Those at the south end of Lake Michigan, with their network of railroads, afford as adverse conditions as can well be found. Scarcely a year passes during which some of the ground is not burned over, and the ranging of cattle increases these unfavorable conditions. But in many spots on the sand hills, especially on their slopes, the White Pine if removed springs up again, and groves are formed in which trees from one to three or four inches in diameter closely crowd each other. If these chance to be protected for a sufficient time they make a respectable growth of timber, the smaller and weaker trees dying out by natural process of thinning. There are also spots where the Pines, both the White and the Gray, have an advantage over the Oaks. They are too damp or wet for any but the White Oaks. They are in hollows among the sand hills or flatter reaches of ground which have been raised above the swampy level by the gradual accumulation of sand brought in by winds and rains and by the deposits of vegetable matter, and thus have assumed drier conditions. Here the main competitors are the American Aspen and the Paper Birch, or, perhaps, the White Cedar. Thickets of Pine spring up in such places from seedlings to trees from ten to twenty feet in height. The soil is peaty, or has too great a supply of organic matter to suit the Oaks. Even the Tamarack may accompany the Pines, and the prevailing undergrowth shows plants adapted to peaty formations. Beyond the dune region in the bordering drift-covered land small areas are found among the hardwoods, where the Beech and the Sugar Maple predominate, in which the White Pine occurs. They are hollows, where sphagnous Mosses, Vaccinium and Gold-thread reveal a peaty soil. The bottoms, once covered with water, have been partially filled by soil washed down from neighboring hills and by the decay of organic matter, but are still wet ground.

Two or three more stations may be specified which show the persistence of the White Pine under different conditions of soil and moisture, as in western New York, where land was taken up and settlements began about a century ago. A farm in this portion of the state, in the western part of what is known as the "Finger-lake" region, came into my possession a few years ago. I examined with interest the remnants of its forest-covering and that on adjoining farms. The soil conditions differ widely from any already described. Its prevailing character is argillaceous. Though the underlying rocks of slate are heavily covered with drift, they are cut into and exposed by streams which rush down the steep hillsides. The principal forest-trees of the uplands are the Chestnut, Sugar Maple, Shag-bark and Bitter-nut Hickories, and two or three kinds of Oaks. The trees were comparatively young, for nearly all the larger ones had been cut down and removed. One of the pieces of woodland on the farm was well stocked with White Pine. It was on the top of a ridge where some gravel or sand was mixed with the clay, but the soil was essentially argillaceous. This wood was a mixed growth of Pine, Chestnut, Hickory and Oak. Scarcely a Pine exceeded a foot in diameter, showing that it was of recent growth. In ravines upon the hill-slope, difficult of access, were older trees, two or three feet in diameter. These were growing in a soil almost purely clay from the decomposed underlying slates, whose harder parts, where exposed, showed that they were slightly arenaceous. But they formed a soil very slippery and unctious to the touch when wet.

West of the Genesee River, and not many miles from this farm, other conditions of growth are found. Some are areas of limestone, with a thin covering of soil whose mineral ingredients are almost entirely derived from the underlying rocks. Silex is plentiful in the form of nodules of flint, the rock being the corniferous limestone of the New York system of geology. As the rocks decompose the nodules break up into flakes, and the soil is often so full of chert and bits of limestone as to resemble beds of crushed stone. Wheat and Red Clover have been the main crops where the more favorable portions of the land have been tilled. The trees are chiefly Oaks and Hickories interspersed with occasional clumps or trees of White Pine. Here the White Pine grows in a calcareous soil, siliceous matter being present from the decaying flint.

Close at hand is still another condition of growth. The streams which drain the slope of country to the south of this outcrop of limestone come down upon it. But it is so fissured or porous along certain lines of underlying gypsum that the smaller streams sink into the earth before reaching the farther edge of an escarpment, and the larger ones lose much of their volume or wholly disappear in the dry season. The water thus lost for a time bursts out again at the base of the escarpment in clear, cold springs. The streams they produce with the contiguous swampy land give rise to Cedar and Tamarack swamps; with the White Cedar and the Tamarack the White Pine is intermixed. The roots of trees in such situations are in contact with a soil more or less pervaded or even saturated with water, though the Pine in most cases affects the drier positions. The water, well charged with mineral matter, is also a cause of the production of drier conditions, for its lime carbonate is deposited in the swamps and marshes, where it is forming extensive beds of travertine which are gradually filling them up. The Pines in places may be seen growing on these beds of travertine, where they appear near the surface. Leaves of trees and of shrubs, aquatic plants and other organisms are imbedded and fossilized in it. They all help to form hummocks of limestone and produce more favorable states for the growth of certain kinds of vegetation, among which the White Pine has taken a place. But the soil is still very wet and prevailingly peaty.

These specific illustrations of conditions under which the White Pine grows could be repeated and extended in all essential particulars by cases taken throughout its range. Extreme cases, or those apparently the most unfavorable, have been chosen in order to show its power of adaptation. Its growth in rocky regions, either of sandstone or the crystalline rocks, as well as in sandy or gravelly areas, is most familiar; that upon the clay hills bordering the outlet of Canadice Lake is the most exceptional in my experience.

Chicago, Ill. *E. J. Hill.*

Plant Notes.

Viburnum dentatum.

"It is wonderful to see the fertility of your country in Viburnums."
—*Collinson and Bartram letters, 1765.*

THE Arrow-wood, Viburnum dentatum, is the most conspicuous small-flowered member of its family, for, unlike the others of this group, it is not restricted to damp ground and shaded woodland belts, but grows equally well on dry banks and in open fields. The foliage is so clean and healthy-looking all summer long, with a striking red marginal coloration in autumn; the white cymes of blossoms are so showy, succeeded by almost equally showy blue berries, that one might reasonably suppose it a plant worthy of attention, but in central Pennsylvania all the specimens that have ever come under my observation have been in a wild state. Of course, this Viburnum, like our other native species, is beautiful anywhere, for, taken as a class, there are no handsomer shrubs in our forest glades. But it does seem almost unaccountable that shrubs adapted to every use and situa-

Fig. 43.—Sprays of Viburnum dentatum.—See page 332.

tion should have been so universally neglected by American planters.

There is some bond between the Arrow-wood and Kinnikinnik, Cornus sericea, which it might be well to remember in planting, for they seem to thrive together when at home, and I have never found the latter in dry ground, except in company with the Arrow-wood. Unlike the Kinnikinnik, also the other blue-berried Viburnums, the fruit of the Arrow-wood is not very attractive to birds. Old mountaineers have told me that the berries were never eaten, but there is every reason to think they are mistaken.

The specimen from which the illustration on page 353 was taken is not very large, being about seven feet high, but it grows in a swampy meadow remarkable for fine Viburnums, and especially for beautiful Black Haw-trees; but the whole place is doomed, as the lower end is already the dumping-ground of a rapidly growing city. It would be interesting to know in round numbers how many, or rather how few, persons know our native Viburnums. The interest in naturalizing native plants is not yet widespread, and this curious limitation in the planting of shrubbery seems to be due to mental and not financial reasons. The average city or suburban dweller feels that he has performed a noble act when one Hydrangea and two Carolina Poplars proclaim aloud his lack of individuality, while in the country the same process of mind results, perhaps, in a purple Althea and some Marigolds. The rural mind ought not to be held responsible for such manifestations of taste, for drudgery of the hardest kind soon kills the æsthetic instinct that almost every one possesses early in life. Country children are often marvels of observation, and, though slow to narrate, they are passionately fond of flowers. In some of the most primitive places the little children make wreaths the livelong day, and garlands often serve the purpose of all other toys. As they grow older the boys' power of observation takes a practical turn, while it is slowly crushed out of the girls, until a new love of the common and distorted replaces the earlier and better taste.

It is the dreadful monotony of country farm-life that retards all movements toward improving conditions, and so long as the great majority of countrywomen on farms spend their lives in depressing drudgery as they do, it is useless to look for any improvement of external conditions. Just so soon as they realize that a "wild" bush like the Arrow-wood is as worthy of preservation as a purple Althea or a mildewed Lilac there will be a great interest aroused that will tell in every village and country lane.

Harrisburg, Pa. *M. L. Dock.*

Entomological.

The Influence of Environment on the Life History of Insects.

IT is not so long since that it was assumed that the life history of an insect being once carefully made out, work with that species was done; and remedial measures once ascertained they need only be restated again and again until all were familiar with them. Acting upon this assumption, which at the time was entirely justified, station bulletins were printed all over the country repeating well-known life histories and well-known means of checking injury. So much of this was done that considerable adverse criticism was aroused, and when some of the entomologists attempted to verify old accepted knowledge, it was objected that there was an unnecessary and undesirable duplication of work. So matters remained for a time, until it was gradually forced upon the worker that his constituents made altogether too many failures to be satisfactory to him or to them. To prove his case he tried his own recommendations, where he had the necessary time and opportunity to do so, and in many instances failed as completely as did his farmer friends. Sometimes these failures were made by men that had succeeded perfectly in earlier days, in other fields, and they repeated their experiments yet more carefully a second season before they would believe in their own results. Observations carried on during the course of the experiments also indicated an altogether unexpected amount of variation from the published histories of many species, and an astounding difference in the amount of resistance to poisons, either external or internal. It is hardly necessary to go into much detail here; but from all sides come accounts of varying and sometimes contradictory results, which seem to demonstrate the necessity of studying each destructive species of insect in each distinct environment.

The notes on the codling moth by Mr. Card, in the issue of Garden and Forest for August 4th, emphasize that point. Mr. Card refers to Professor Washburn's results in Oregon, but does not mention the more detailed observations of Mr. Slingerland in New York on the same subject. His own observations differ greatly in some respects from those made by the gentleman just cited, and they will not do at all for New Jersey. Observations made in Germany indicate a yet different habit from any observed here, and the situation in California will prove yet different.

Mr. Card places much stress, and rightly, on the fact that in Nebraska Apples blossom, set and even close the calyx cup before the moths appear or the eggs are laid. In New Jersey that is not so. It is almost impossible to find an unhatched pupa in the orchard after the blossoms begin to drop. In our state there is nothing but larvæ to be found in the cocoons until the first spell of warm weather that starts the sap in the trees and induces a swelling of the buds. Then, almost over night, everything enters the pupal stage, and this is usually short —much less than the duration of blooming-time in an Apple orchard. But even in New Jersey differences exist. Near New Brunswick there is positively a single annual brood only. South of Burlington County there is at least a partial second brood, and the practice that would prove perfectly satisfactory in one locality would be distinctly imperfect in the other. The truth is that insects, like all other creatures, adapt themselves to their surroundings, and that their habits and life histories are different in even slightly different localities. I have never seen the egg of a codling moth on a leaf, and I believe none has been previously recorded. Nevertheless, I do not for a moment discredit Mr. Card's observation.

We have a similar set of experiences with insecticides. Insects which succumb readily to kerosene in the Atlantic states defy it absolutely in Colorado, while we are just as likely to find the food-plant much more sensitive to it. Washes that easily destroy the San José scale in California are ridiculously ineffective in the Atlantic states. This very scale is changing its life history and habits in the east materially in several directions. I will venture the prediction that in half a dozen years it will not be considered a first-class pest in New Jersey, though I would not like to extend this prophecy to localities with which I am less familiar.

The point of all this is that we must begin afresh our studies on the life history of many of our common insects, with special reference to the locality where the study is made. There will be some duplication of labor, but the work will be comparatively easy because of what has been already accomplished. I am certain that in some cases our practice will be completely changed, and some confusing and distracting results will be satisfactorily explained.

It has been too much the practice, perhaps, to consider discrepancies between the results of recent and older observers as proof of the superior accuracy and reliability of the former, but it is worth while to inquire in all cases whether both have not been correct and whether the differences are not due to the varying conditions in the insects themselves and their surroundings.

New Brunswick, N. J. *John B. Smith.*

Cultural Department.

A Renewed Outbreak of the Asparagus Rust.

EARLY this spring the appearance of this fungus was noted in Garden and Forest (see page 236), and since it is a new and alarming enemy, Dr. Halsted has sent out a fresh circular of warning. In a badly infested Asparagus field the plants generally appear as if they had matured unseasonably, and instead of their usually healthy color the field looks brown, as if frosts or insects had robbed the plants of their vitality. When viewed near at hand the diseased plants are seen to have the skin on the stems, large and small, blistered, and in the ruptures of the epidermis dark brown spots can be detected as shown in the figure below. These brown dots or lines are of various sizes and shapes, and remind the close observer of similar spots in the broken skin of stems of grains and grasses and of the leaves of corn, also due to rusts, but not the same kind as that of the Asparagus.

The Asparagus rust is due to a fungus, Puccinia asparagi DC., that is, a minute plant consisting of microscopic

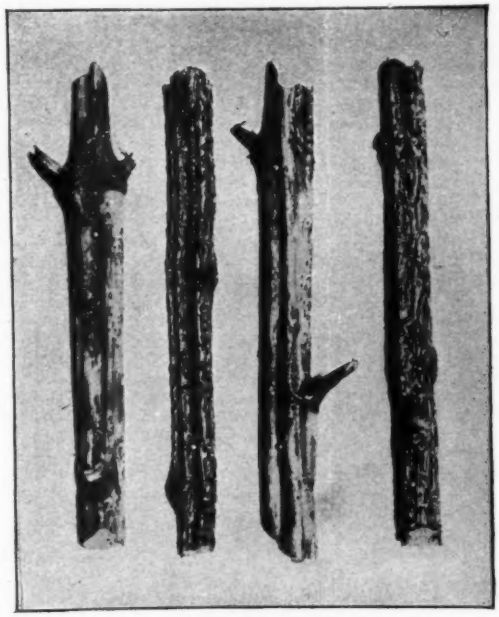

Fig. 44.—Portions of Rusted Asparagus Stems.

threads which grow through the substance of the Asparagus plant, taking up the nourishment that is needed, and finally break through the surface to bear the innumerable brown spores that give the dark color to the spots on the Asparagus stems. This is the last stage in the development of the rust fungus, and as such remains over the winter. When the warm, moist weather of spring and summer comes, the spores above mentioned germinate and a new lot of Asparagus plants may become infested.

There are two general methods of checking the rust, namely, by destroying the spores and by preventing their growing upon, and getting a foothold in, the substance of healthy Asparagus plants. The rust fungi are among the most difficult to check—by protecting the plants they feed upon—by means of fungicides, Bordeaux mixture, etc., sprayed upon them during the growing season. While something may be hoped for with the spraying pump, the chief method of eradication lies in the destruction of the many spores. This can be done in a very simple and effective manner by carefully gathering all the parts of the Asparagus plants that are above ground and burning them. It would be a waste of time to stack the tops and leave them to natural decay; and to place them in manure-heaps would be still worse. The only safe thing to do when a serious enemy like this is in the Asparagus field is to burn the plants, even to the last scrap that can be gathered up. Let this be done at once, for any delay means the breaking up of the brittle, rusty plants, and a generous sowing of the spores upon the ground. If the fire could go over the whole field and burn all the small as well as the large pieces, this would be the best of all.

The Hybrid Gladioli.

SUMMER-FLOWERING Gladioli are now at their best. Fine effects can be made by planting them in groups of one color or by arranging them in lines of separate colors, and their decorative value is thus enhanced. A mixed bed cannot be arranged so well, and the result is often an inharmonious medley. Again, mixed varieties, sold as unnamed seedlings, no matter how much inbred to conserve the type, still revert, and vary greatly in time of blooming.

The direct hybrids and inbred crosses from the first were superior to the types in beauty. The Gandavensis type or section is the oldest and best known. It originated half a century ago as a cross between Gladiolus psittacinus and G. oppositifolius. Their showy colors and the ease with which they are cultivated made them at once permanently popular. The Brenchleyensis, with scarlet flowers, is one of the best representatives of this type. All are characterized by erect, somewhat trumpet-shaped flowers and an upright and close arrangement on the spike. Professor Gibbs is a fine example. It is a handsome purplish pink with a white blotch, and originated from seed sent by Dr. Gibbs, of Newport, to Professor Sargent, of Brookline. Others are John Laing, deep red; Agathe, rose tinted with orange; Feu Follet, white, throat striped with red; Rayon d'Or, straw-colored, with red markings; Snow-white, an excellent variety for florists; Sultanæ, satiny rose. Probably a thousand varieties have received names, and a large number of these are in cultivation to day.

The finest colors among Gladioli occur in what is known as the Lemoinei section, and the form of flower is also distinct, with the hooded characteristics of one of its parents, G. purpureo-auratus, strongly marked. The strongly contrasted coloring, divided as if by lines, makes the most attractive feature. Rich red and yellow shades predominate, but there are frequent shadings of white and pink. The well-marked blotching readily calls to mind some of the fancy French show Pelargoniums. Some of the best are André Chenier, pink, with large satiny black blotch bordered with yellow; Mademoiselle Lemoine, straw-yellow, with purple blotches; Masque de Fer, bright red, lower segments deep maroon, with yellow centre, specially good; E. V. Hallock, sulphur-yellow, large crimson blotch, white centre and border of yellow.

The introduction of Gladiolus Saundersii about a dozen years ago brought to the notice of the hybridizer a new large-flowered species, with flat, orange-scarlet blooms and a conspicuous lower segment. G. Saundersii is hardier than many of the hybrids, and frequently has endured the winters here. Crossed with some of the hardier species it has given us the Nanceianus section. This, as well as the Lemoinei group, is hardy in Europe, but the corms should be lifted here, though they occasionally stand through the winter. The Nanceianus group is characterized by large open flowers, and many are finely marked. Some of the best are Fred Bergemann, salmon-red; Canrobert, purplish marked, and striped with rose; Charles Baltet, rosy-violet, with white throat; G. Paul, velvety crimson, with yellow blotches.

Still another type has originated, known as the Childsi, which is from a cross between Gladiolus Saundersii and the Gandavensis hybrids. Thus far it is in the hands of the hybridist, but soon many varieties will be in cultivation.

Gladioli do best in a rich, well-drained soil, and should not be planted more than three inches deep. This has been a favorable season for these plants on light soils. They enjoy abundant moisture when growing. It is better to lift the corms before frost cuts them down, and store them in frames with a little sand or soil over the roots, and they thus ripen gradually and thoroughly and the food stored in the stems and leaves returns to the bulb. Bulblets form about the base of the old bulbs, and when a variety is extra fine it should be marked so that these can be taken care of at lifting time. If planted separately the following spring they will make fair corms the same season. Gladioli are easily raised from seed, with even less trouble than onions. Large numbers of

unnamed seedlings are each year put on the market. This would be well enough if the raisers would take the trouble to flower them and cast aside the worthless varieties. Although some of the finest varieties have come from random crosses, yet comparison with carefully fertilized seed will show a marked difference in the seedlings. There is no doubt that Gladioli and many other summer-flowering roots are much injured in the seed stores by being kept in hot, dry rooms, and they should be stored in a cool place, for much vitality is lost when they are forced into growth before being planted. Early planting is best. If put into the ground in April they will make good roots and not be above the soil before danger of frost is past.

Wellesley, Mass. *T. D. Hatfield.*

Sparaxis pulcherrima.

A CERTAIN gentleman always asks me when we meet what I have that is new, meaning in the horticultural line. The next time I shall answer, with much pride, that Sparaxis (Dierama) pulcherrima has kindly blossomed in my garden. I feel much pleased, for I have never seen it elsewhere, and several experts of my acquaintance have given it up as an intractable subject. The only secret, I fancy, is to wait for the flowers until the plant is strong enough to produce them, and the treatment I have given has been of the simplest kind. I raised the plant from seed about six years ago and kept it for two years in a pot, but, finding the growth slow and unsatisfactory, I turned it out into the open ground near my Ixia-beds, and there it has been ever since. Its foliage remains fresh and green until the end of November, when I cut it off near the ground and cover the roots with four inches of Pine-leaves. In the spring the new shoots appear about two weeks later than the Ixias, a tardiness which once caused me to report in this paper that the winter had killed it.

The narrow foliage, in appearance much like a Sedge, attains a height of about two feet. The flower-stalks would be five feet high if they stood erect, but the weight of the flowers causes them to arch over in a graceful curve. Besides the chief cluster at the ends of the stalks, which open first, there are numerous spikelets, each with from five to eight flowers of the same bright violet-crimson color hanging at regular intervals. As the terminal blossoms drop, the stalk assumes a semi-erect position, which, of course, causes the spikelets to arch during their time of blooming, and, as the seeds in the terminal capsules become large and heavy, the main stalk is again brought down in an arch. The swaying of the stalks with every breeze adds much to the attactiveness of the plant.

Canton, Mass. *W. E. Endicott.*

Some August Flowers.

ASCLEPIAS INCARNATA, a native Milkweed, with light pink flowers, makes a good display when grown in a garden. It is somewhat umbrella-like in form, the top covered with flowers, and these are borne for about six weeks during July and August. In damp places, near creeks, where it is often found, it is not uncommon to find plants with flowers almost white.

Dicentra eximea is one of the most constant blooming of herbaceous plants, and is in flower from early summer until late in autumn. The flowers are purplish rose, not a striking color, but its ever-blooming character is a great point in its favor. In the same list may be placed Callirrhoë involucrata, with bright rose-colored flowers, and Origanum vulgare, rosy purple. Both of these plants are constantly in bloom. The Callirrhoë is an almost prostrate plant, while Origanum reaches a height of two to three feet.

Daphne cneorum, whose sweet-scented flowers are so numerously produced in early spring, is abundantly full of blossoms now. In fact, it is rarely without flowers at any time during the season, and they become more abundant in late autumn. It delights in a rich, sandy soil.

Germantown, Pa. *Joseph Meehan.*

Heliopsis Pitcheriana.—This plant, of which the English garden papers speak highly, is plainly but a selected form of Heliopsis lævis, as self-sown seedlings at once revert. For years it has been one of our worst weeds. It is hard to kill, crowds and robs other plants to their exclusion, and is fit only for the roadside. As a decorative plant it is not nearly as handsome as our common Rudbeckia hirta or Coreopsis lanceolata, which here has strayed from the borders and keeps it company.

Wellesley, Mass. *T. D. Hatfield.*

Correspondence.

Arsenate of Lead with Bordeaux Mixture.

To the Editor of Garden and Forest:

Sir,—I was somewhat surprised this year in making a test of a combined fungicide and insecticide—arsenate of lead and Bordeaux mixture—to find that both foliage and fruit of Crab-trees, to which it was applied, were seriously injured.

I used four pounds each of copper sulphate and lime to each forty-five gallons of water, and to this added four ounces of arsenate of lead. Three applications were made. The amount of injury increased with each application from "slight," "considerable" to "severe," and consisted of a burning of the foliage; a rusting and scarring of the fruit. Arsenate of lead and Bordeaux mixture applied separately to adjoining trees produced no injurious effects. I should like to know if similar results have been noted by other experimenters.

Central Experimental Farm, Ottawa, Canada. *John Craig.*

The Codling Moth.

To the Editor of Garden and Forest:

Sir,—Professor Card's article on this subject in your issue of August 4th is a most timely and valuable one. This year, in the Mesilla Valley, New Mexico, I have been trying various measures for the destruction of the codling moth, after becoming convinced that mere spraying, as ordinarily recommended, was of very little avail. The rate of increase in this warm climate is prodigious. The moths from over-wintered larvæ emerge with us as early as April 24th. The second generation of moths, or rather the moths of the first lot of 1897 larvæ, appeared at the end of June. By the end of July another cycle was completed, and for the third time moths were on the wing. The young larvæ of the third generation of this summer are now (August 9th) in the apples.

At the end of March we had the test orchard well searched for hibernating worms. Great numbers were found under loose bark, but the places where they most congregated were cracks in dead wood or old stumps. All such cracks should certainly be stopped up with wax. The worms were destroyed to a considerable extent during the winter by woodpeckers, and a Clerid larva also devoured them. We found many more worms in the apple cellar belonging to the orchard than on the trees; such places should always be searched. Toward the end of May the wormy apples were picked off the trees, as far as they could be found, and destroyed. About 14,000 wormy apples were found on 650 trees. The apple crop was a large one, and the injury done by the first brood was not of the slightest consequence. On June 2d, when the picking was finished, it was found that the part of the orchard which had been sprayed was about as wormy as the rest.

By banding the trees we have caught great numbers of the worms, but they are gaining on us, nevertheless. It will not be possible to estimate the results of the work done until the end of the season, but the outlook is certainly discouraging. I find no hymenopterous parasites of the worms here, though some die from the attacks of the fungus Sporotrichum, especially in confinement. Certain orchards which had no apple crop last year, owing to late frosts, show this year comparatively few worms, even when no measures have been taken to prevent the attack. We seem to have obtained good evidence that the moths do not ordinarily fly any great distance, but lay their eggs on or near the trees on which they bred.

Mesilla, N. M. *T. D. A. Cockerell.*

The Elm-leaf Beetle.

To the Editor of Garden and Forest:

Sir,—Referring to the communication by Professor Britton in last week's issue of Garden and Forest, if spraying is thoroughly well done, a season can be occasionally passed, provided there are not too many sources of infestation in the immediate vicinity. Nevertheless, trees will be considerably injured by omitting even a single year's work under ordinary circumstances, as the state of affairs in New Brunswick during the present season will illustrate.

During the early part of 1896, Elm-leaf beetles were excessively abundant, and a large proportion of the trees in the city were defoliated. Considerable spraying was done by the City Improvement Society, and trees treated under their direction were generally in fairly good condition. The trees on the College Campus were treated, as usual, with arsenate of lead, and remained in good condition throughout the season. During the early part of July, when the larvæ were about full

grown and ready to pupate, a period of peculiar weather favored a disease which attacked the larvæ and pupæ to such an extent that only scattering beetles here and there escaped. It was a true epidemic disease, and so fatal that it was almost impossible to get together a small collection of adult beetles for which I was asked by a correspondent. Very few beetles were seen during the winter in their ordinary hiding-places, and the janitors of the College buildings informed me this spring that where they had been in the habit of sweeping up quarts in previous years, they then saw only an isolated beetle here and there. So few beetles were seen early in the spring that I decided to omit the first spraying of the trees on the College Campus, and so few eggs were laid that, as an experiment, I decided to omit spraying altogether. When the larvæ hatched, however, it was seen that there were a great many more insects than had been counted upon. The trees on the Campus remained in fairly good condition, although some branches here and there showed a considerable proportion of eaten leaves; but in other parts of the city European Elms showed just as much injury as they had manifested during previous years. Under ordinary conditions, thorough spraying will kill a very large percentage of the insects that would otherwise come to maturity; but even under the best treatment a small percentage will survive, and that percentage will be sufficient to stock the trees during the season following. We have only one brood of the insects in New Brunswick, and in times past we have not found two annual sprayings any too much to keep the insects in check on the trees surrounding our institution.

I consider it a poor plan to adopt the suggestion that only one-half the trees in a city be sprayed each year; but on the other hand, I think that if one part of the city was thoroughly sprayed twice one year it could be protected by a single spraying the second year. The recommendation is always to make a spraying when the adults appear, so as to prevent them from laying eggs as far as possible. The second spraying should be made when the eggs are all hatched, to kill the larvæ and prevent their development to beetles. If that be done thoroughly one year it would be necessary the year following to make only the second spraying to kill off the larvæ. In a season like the one through which we are now passing, the Elm-trees support insect injury very well, because there is an abundance of moisture to enable them to repair damages. I fully expect that spraying will have to be thoroughly done on the trees near our buildings next season, because there have been many more beetles developed this year than were permitted to come to maturity for several years past, when active measures were taken.

Rutgers College, New Brunswick, N. J. *John B. Smith.*

Critical Notes on the Loganberry.

To the Editor of GARDEN AND FOREST:

Sir,—It has been a good season to discover imperfections in this new fruit as grown here in the east, and we have a short list of them to record. It is possible that some of these may be false accusations, and that when we understand the peculiarities of the plant better we shall know that they are the result of improper treatment, rather than natural traits, but for the present it is only fair that they should be noted as faithfully and given as much publicity as the good qualities that were observed last year.

First, all of the canes that were not covered last winter winter-killed nearly to the ground.

Second, the canes that were covered with earth about the middle of January were apparently injured considerably before that time, but the plants that were covered about the 20th of November wintered admirably.

Third, even where the canes were not injured, the fruit did not mature well this year. There was every indication that the few plants that we had would yield a large crop of excellent quality, until about the middle of June, or when the earliest berries began to turn red; then it was noticed that the leaves on the fruiting canes were blighting, and later this developed into a blast that extended to the berries, and they began to show brown spots, which, upon examination, proved to be where the pulp had dried down upon small groups of seeds, and usually it was the seeds near the hull at the base of the berries that were affected. This trouble was attributed to the excessively wet weather, and this theory is supported by the fact that Black Cap and other early Raspberries appeared to suffer severely from the same cause, although they showed the effects differently.

Fourth, some of the Loganberry-plants seem to be either diseased or to lack constitutional vigor. The leaves of such plants are small and light-colored and the growth puny, while other plants growing beside them are exceedingly vigorous. We have noticed these plants in every lot of the Loganberry planted, and have not been able to find a satisfactory reason for their condition. So far as observed by us, such plants never amount to anything.

The young plants propagated from hard-wood cuttings last winter have exceeded our expectation in vigor of growth. Already they have outgrown the seedlings of the same age, and are hard in pursuit of the stolons that started into growth much more freely than they did in the spring.

We still are inclined to believe that the Loganberry may be profitably grown for market in New England, at least in small quantities, although we are free to confess that we are disappointed in the behavior of the plants here this season.

Rhode Island Agricultural Experiment Station. *L. F. Kinney.*

Electricity in Vegetation.

To the Editor of GARDEN AND FOREST:

Sir,—There is little doubt that nature makes an important use of electricity in the growth of vegetation, the blossoming of flowers and the ripening of fruits. The method of electric appropriation and action is as yet not fully understood, but the secret will be revealed to man during the coming years. Just as science is proving that the nerves of the human body show polarity under the action of electric currents, so it is shown that there are currents of electricity in all parts of vegetables except those which are insulated with dry bark, etc. In flowers the currents are more feeble, but in the succulent fruits and certain cereals they are of considerable strength, depending upon the season, being greatest in spring-time when the plant is rich in sap.

Atmospheric magnetism is seen in tree-growth. Branches on the edges of groves are drawn outward by the electrical attraction of a highly oxygenated atmosphere and that of the unshaded earth. Artificially electrified soil increases plant-growth, as every one is aware. Some curious experiments have already been made in electrical-plant culture, and results have been obtained which warrant their continuation, although they have not yet reached that point of permanent scientific development which insures a fruitful transformation of fields and market-gardens by means of artificial electrical stimulus.

It has long been known that fruits exhibit electrical conditions, and that in puncturing them at their electrical poles and closing the circuit, it has been possible, by means of special mechanism, to study the magnetic variation. The ascending sap of trees and the cortical sap (which, as is well known, have not the same chemical composition) react upon each other, giving marked electrical phenomena. From the pith to the cambium the envelopes are electrically less and less positive; from the cambium to the epidermis they are more and more so.

What is to be the future of patient experimentation along these lines? Already in hot-houses fruits are forced by strong electric illumination. Possibly by reinforcing this external action with the passage of an electric current in soils charged with chemical products marvelous results shall be obtained—fruits and flowers magically improvised, forests created as by a fairy wand out of denuded deserts. Such improvisation has nothing improbable about it in view of the experiments which have already shown the mysterious and powerful influence exerted by electricity and magnetic currents upon vegetable life.

Chicago, Ill. *Rosa G. Abbott.*

[A pleasing speculation—but prophecy is quite unsafe.—ED.]

Recent Publications.

An Illustrated Flora of the Northern United States, Canada, etc. By Nathaniel Lord Britton and Hon. Addison Brown. Vol. II. New York, 1897.

The second volume of this notable work completes the Choripetalæ and includes the Gamopetalæ through Menyanthaceæ. The success which it has attained justifies the wisdom of the great undertaking. As an exposition of views that are undoubtedly gaining ground it must needs take a peculiar place in the future study of the flora with which it deals. Whether these views will meet with general acceptance in their entirety or not, it is an advantage to have them so ably presented. If the analytic as opposed to the synthetic method of treatment of plant forms seems sometimes carried to the extreme, we cannot close our

eyes to the fact that such tendency is encouraged by the recent increase of active field study, the lack of which in the past has undoubtedly left regrettable marks on our botanical literature. Though the general outlines of the flora of a new country must necessarily be drawn from closet study, the details cannot safely be left to that alone, and the success achieved by some of the newer hands in the elaboration of our eastern flora, largely due to careful field investigation, should be gratefully acknowledged. Some of the best results of such study find place here for the first time in a general work.

We again express our pleasure at seeing our plants arranged in a sequence so much preferable to the accustomed one, and their descriptions accompanied throughout by figures. Some of the latter leave much to be desired, but most of them are fairly excellent and must be of great service to those for whom they are intended—that is, the unprofessional students who need confirmation of their determinations made from descriptions. It is not fair to expect elaborate illustrations under the limitations enforced by the plan of this work or that the specialist should always find them adequate.

Notes.

We recently received some specimens of the new black cherry, the Dikeman, from Mr. S. D. Willard, of Geneva, New York. The fruit was picked on August 16th and was in excellent condition when it reached us, nearly a week later. It is of good size, remarkably firm and very sweet; indeed, it would be better with a little touch of acid. It is certainly the finest cherry we know which ripens so late.

The Black Locust is a common tree in West Virginia, where it is found in groves of considerable extent and is of great commercial value on land that has been allowed to revert to forest after having been used for agricultural purposes. In the late annual report of the West Virginia Experiment Station, Professor Corbett says that it is considered of greater value than any native wood for use as driving blocks in sinking points for driven wells. The timber closely approaches in value that of Red Cedar for posts, and this, together with its rapid reproduction, constitutes its greatest value, although it is much sought for by the manufacturers of hubs for carriage wheels and for other uses where great resistance to pressure is required. The largest Black Locust in West Virginia stands near the entrance of an abandoned coal mine, not far from Morgantown. It is a remarkable tree, being fully four feet in trunk diameter and at least one hundred feet tall.

The section of Florida adapted to the open-air cultivation of the Pineapple on the east coast and in the middle of the peninsula is mostly on ground that northern farmers would consider barren sand dunes. Nevertheless, there is much good plant-food in the soil, and good Pineapple land near West Palm Beach, for example, costs from $150 to $250 an acre. Plants of the red Spanish variety cost something like $4.00 a thousand, and from eight thousand to ten thousand can be grown on an acre. It is found advisable to set them close together so as to suppress weeds and prop up each other's fruits, for if set wider apart the fruits are inclined to grow large, topple over and become sunburned on one side. A correspondent of *The Country Gentleman* states that good suckers will fruit in twelve months after setting. Plants set in August or September will give a good half crop the following May and June. The open-air pineries of the Indian River do not, as a rule, produce more than a hundred standard eighty-pound crates to the acre, but they will keep this up from three to six years without renewing. If the grower nets from $1.50 to $1.75 a crate he is doing well. Of course, this is no price for fancy pineapples under glass.

Within the past fortnight 207 carloads of California pears, peaches and plums, with a few grapes and nectarines, have been sold in this city. And, of course, this large quantity is only supplementary to supplies of the same kinds of fruits from eastern, southern and middle western states. On Monday of last week, for example, thirty-three carloads of California fruit were sold, the largest amount ever disposed of here in one day. During the same week peaches from eleven other states formed part of our supply, so that it is not surprising that very low prices were the rule for the showy but less luscious California peaches. The best freestones from the Pacific coast have been selling here for seventy cents a box, while many have brought but forty-five cents, and, contrary to general experience, clingstone peaches, because of their large size and showy color, commanded higher prices. Seckel pears were a small part of these shipments, along with the handsomest Bartletts ever offered in our markets, and as much might be said for the plums now in season.

According to a correspondent of the *Evening Post* the army of pickers that descends upon the Cranberry bogs of Wisconsin every autumn is composed chiefly of Poles, Indians and half-breeds, the Indians being considered the best pickers because they never strike and always accept the prices offered by the overseers. As a rule they earn a dollar a day and their board. They bring their lodges and tepees with them and camp on the field. The Indians will not begin to work until half-past nine in the forenoon and they promptly knock off at four in the afternoon, in spite of persuasions or threats. This peculiarity sometimes proves costly to the growers, for if a killing frost is threatened in the night the owners are compelled to hurry about and hire more white pickers, since it is a waste of time to try to get an extra hour's work out of an Indian. He would see the whole field frozen stiff first. At such times the Poles realize the advantage of the situation and demand extra wages for overwork. The Indians are good weather prophets and serve a useful purpose in foretelling when to prepare for frost, and when the word issues from the lodge of a chief that frost is approaching the bogs are immediately flooded and extra help is employed. If the water covers all the berries in time no damage happens, but those that are left exposed will be ruined.

Some investigations by Mr. A. F. Woods, of the Division of Vegetable Pathology in the Department of Agriculture, seem to indicate that the so-called "bacteriosis" of Carnations, first described by Dr. Arthur in 1889, is not due to bacteria, but is a direct result of injuries to the plant by thrips or aphides. In a paper read at the recent meeting of the American Association for the Advancement of Science, Mr. Woods brought out the fact that neither fungi nor bacteria are present in the earlier stages of the disease, and that their presence is not constant as the disease advances. A disease with all the characteristics of this bacteriosis, excepting the presence of bacteria, can be produced by aphides, and since the injuries in their earlier stages are not accompanied by bacteria, the aphides cannot be charged with carrying any infectious germ. The Carnation is readily influenced by extraneous conditions, and the reaction to the injuries of aphides and thrips vary largely, and plants carelessly grown suffer more seriously from punctures by the aphis than vigorous plants do. The sum of the matter is that the greatest care should be used in selecting and propagating stock, in furnishing conditions for vigorous growth and in keeping down aphides and thrips. It is these insects, and not bacteria, with which the practical grower must contend. Of course, good stock and good conditions of growth can never be neglected, and Mr. Woods' investigations give emphasis to what growers already know—that the disease is often the result of neglect, and that the way to have healthy plants is to give the closest attention to every detail of culture.

Many Orchids which grow and flower luxuriantly for some time after their importation gradually fall away and ultimately die. Various theories for this degeneration have been put forward, but the puzzle remained unsolved until now, when some experiments in France, reported in a recent number of *The Orchid Review*, seem to give a satisfactory explanation. Flowering is an exhaustive process, and investigations were made with Cattleya labiata, which produces many flowers and is grown in a mixture of Fern fibre and sphagnum, which contain little nutriment. The Cattleya was analyzed chemically in 1891 when it was imported, and a similar analysis was made of plants in 1897 after six years of cultivation. The results given in comparative tables show that the latter plants contained less dry material, less organic matter, potash, lime, magnesia, phosphoric acid and nitrogen, while water, sulphuric acid and two or three other substances, which were only present as traces in the imported plants, have increased. This analysis seems to show that the degeneration is attributable to exhaustion caused by the production of flowers without any means taken to compensate the plants for loss. The conclusion arrived at is that in order to counteract this exhaustion, Cattleyas, at least, should receive a mixture of suitable fertilizers containing nitrogen, phosphoric acid, potash, lime and magnesia. All this means that Orchids are subject to the same laws as other plants; that we cannot go on cropping without supplying food. But just here the question to the practical Orchid-grower comes, How shall these elements be most successfully applied?